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10/711,231	09/02/2004	Mark Randall Hardin		5230

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EXAMINER	
GIGLIO, BRYAN J	

ART UNIT	PAPER NUMBER
2192	

DATE MAILED: 06/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/711,231	HARDIN ET AL.	
	Examiner	Art Unit	
	Bryan J. Giglio	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *9/2/2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☒ Claim(s) *9 and 10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Objections

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

In regards to lo claim 7, the specification does not include antecedent basis for "2 sets of said sensors and their corresponding alternating reflective and non-reflective markings" "oriented at 90 degrees to on another on a single surface, permitting measurement in *two perpendicular dimensions.*"

In regards to claim 10, the specification does not include antecedent basis for defining "reference mark" (claim 10, line 3) so that the meaning of the term "reference mark" will be construed to be any one of the "multitude of alternating reflective and non-reflective markings," (claim 1, line 3) previously claimed.

In regards to claim 14, the specification does not include antecedent basis for "a multiple of said detectors" "used in order to detect and recover from any flaws that may exist in said surface."

Claims 7, 10, and 14 are likewise objected to.

Claim 9 is objected to for unclear technical description. It is suggested that the word "oriented" be replaced with "phased".

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 7, 10, and 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement and written description requirements. The claims contain subject matter which was not

described in the specification so as to enable one skilled in the art to which it pertains to make and/or use the invention.

In regards to the enablement requirement, Claim 7 recites the limitation "wherein 2 sets of said sensors and their corresponding alternating reflective and non-reflective markings are oriented at 90 degrees to on another on a single surface, permitting measurement in *two perpendicular dimensions* (emphasis added)." No information can be found in the specification detailing the usage of two sensors at 90 degree orientation on a single surface, and no description can be found detailing how this would make measurement in two perpendicular dimensions possible, particularly considering the single dimension parallel track system disclosed.

In regards to the enablement requirement, Claim 10 recites the limitation "electronic signal that indicates the present of a reference mark." No information can be found in the specification detailing the usage of a reference mark, or how a reference mark differentiates from the described alternating marks used for determining relative position.

In regards to the enablement requirement, Claim 14 recites the limitation "wherein a multiple of said detectors are used in order to detect and recover from any flaws that may exist in said surface." No information can be found in the specification detailing the existence of flaws in the surface, or the use of multiple sensors to detect or recover in the event of flaws, or the technique of using multiple detectors to accomplish such a purpose.

In regards to the written description requirement, claims 7, 10, and 14 are rejected for the reasons previously stated in the respective claim objections above.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "between" (line 5) and "between" (line 6). It is unclear in light of the embodiments of the specification whether "between" the sensor and surface means displacement in the direction of motion perpendicular (or normal) to the surface or displacement parallel to the plane of the surface (or along the length of the track), in each instance of the word "between." For the purposes of applying art and as a suggested amendment to the claim, claim 1 will be construed to mean "whereby displacement of [between] said sensor along [and] said surface is measured through slideable movement of [between] said sensor along [and] said surface..."

Claim 7 recites the limitations "said sensors" in lines 1-2 and "their corresponding alternating reflective and non-reflective markings" in lines 2-3. There is insufficient antecedent basis for these limitations in the claims. For the purpose of applying art, "said sensors" will be construed to be two or more of the "sensor" from claim 1, rotated 90 degrees relative to each other combined as a single device that moves as one object, and "corresponding...markings" will be construed as markings made like a checkerboard pattern across a surface plane.

Claims 8-10 recite the limitation "the output" in line 1. There is insufficient antecedent basis for these limitations in the claims. For the purpose of applying art, "the output" will be construed to be two channels of varying electrical voltage signal readable from a single sensor.

Claim 10 additionally recites the limitation "the presence" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 11 recites the limitations "the electronic signals" in lines 1-2, "said sensor's output" in line 2, and "the amount of light" in lines 2-3. There is insufficient antecedent basis for these limitations in the claims.

Claim 12 recites the limitations "the electronic signals" in lines 1-2 and "said sensor's output" in line 2. There is insufficient antecedent basis for these limitations in the claims. For the purpose of applying art, "the electronic signals" of "said sensor's output" will be construed to be two channels of varying electrical voltage signal readable from a single sensor as described in claim 1.

Claim 13 recites the limitations "the electronic signals" in lines 1-2 and "said sensor's output" in line 2. There is insufficient antecedent basis for these limitations in the claims. For the purpose of applying art, "the electronic signals" of "said sensor's output" will be construed to be two channels of varying electrical voltage signal readable from a single sensor as described in claim 1.

Claim 14 recites the limitation "said detectors" in line 1. There is insufficient antecedent basis for this limitation in the claim. For the purpose of applying art, "said detectors" will be construed to mean that each detector is a single beam emitter and receiver package that produces one channel of information, and "detectors" may be 1 or more detector in a single sensor package, where for example, two detectors my be physically positioned on a single sensor to produce two signal channels in quadrature.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 7-11, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoki (US PGPub 2002/0018220 A1).

In regards to claim 1, the Aoki reference teaches a measuring device comprising a surface of arbitrary length and curvature (see Figure 9; see also [0056]) upon which is placed a multitude of alternating reflective and non-reflective markings (see element 11, "two dimensional optical gratings"; see also [0036]), and a sensor capable of detecting said alternating reflective and non-reflective markings (see element 3; see also [0056]) whereby displacement between said sensor and said surface is measured through slideable movement between said sensor and said surface of arbitrary length and curvature. (see [0009], "relatively movable along said first and second axis).

In regards to claim 2, the Aoki reference teaches the device wherein said alternating reflective and non-reflective markings are contained on an adhesive tape (see [0057], "flexible resinous substrate"), which is subsequently applied to said surface (see [0057], "stuck onto an object").

In regards to claim 3, the Aoki reference teaches the device wherein said surface is inherently non-reflective (see [0057], "an object") and said reflective markings are applied to said non-reflective surface (see [0057], "stuck onto an object").

In regards to claim 4, the Aoki reference teaches the device wherein said surface is inherently reflective (see [0057], "an object") and said non-reflective markings are applied to said reflective surface (see [0057], "stuck onto an object"). The "two dimensional optical gratings" (element 11) being applied to "an object" may be applied to any object including one which has already had gratings applied to it. The two dimensional gratings are inherently both reflective and non-reflective, since it depends on the type of sensor being used on it. See [0037] for the different types disclosed.

In regards to claim 7, the Aoki reference teaches the device wherein 2 sets of said sensors and their corresponding alternating reflective and non-reflective markings are oriented at 90 degrees to one another (see element 11, "two-dimensional") on a single surface permitting measurement in two perpendicular dimensions (see element 3; see also [0037]).

In regards to claim 8, the Aoki reference teaches the device wherein the output of said sensor consists of one electronic signal (see [0038] "Photodiodes that output...signals") thereby able to measure motion in one direction (see Figure 8).

In regards to claim 9, the Aoki reference teaches the device wherein the output of said sensor consists of two electronic signals (see [0038] "Photodiodes that output...signals"), oriented 90 electrical degrees from each other (see [0037], "phase difference of 90 [degrees]"), thereby able to measure motion in both directions (see [0038], "two-dimensional encoder").

In regards to claim 10, the Aoki reference teaches the device wherein the output of said sensor includes an electronic signal (see [0010], "displacement signal") that indicates the presence of a reference mark (a starting or "reference" location is required to measure "displacement" which is a vector quantity by definition. Any one of element 11 can be therefore considered a "reference mark").

In regards to claim 11, the Aoki reference teaches the device wherein the electronic signals of said sensor's output are analog representations (see [0038], "signal intensity") of the amount of light detected by the sensor (see [0039], "light reflected from scale enters").

In regards to claim 14, the Aoki reference teaches the device wherein a multiple of said detectors are used (see [0069], "bundle of plural photodiodes in phase") in order to detect and recover from any flaws that may exist in said surface. It would have been understood by a person having ordinary skill in the art to

which the subject matter pertains that a "bundle of plural photodiodes *in phase*" would be for the purpose of detecting and recovering from any flaws.

Claims 1 and 8-13 are rejected under 35 U.S.C. 102(b) as being anticipated by the *Pittman 35mm ROSE Encoder*, http://www.clickautomation.com/PDF/categories/Rose%20Encoder%20Information.pdf, dated August 14, 2003, in light of the Agilent HEDR-8000 Reflective Optical Surface Mount Encoder as described in the cited data sheets, including *Reflective Optical Surface Mount Encoders - Technical Data*, http://www.avagotech.com/pc/downloadDocument.do?id=3056, dated February 19, 2004 (Copyright 2003) and *Design and Performance Considerations with the Agilent HEDR-8000*, http://www.avagotech.com/pc/downloadDocument.do?id=4608, dated August 20, 2002 (Copyright 2002). These references will be referred to as *Agilent – Technical Data*, and *Agilent – Design,* respectively.

In regards to claim 1, the Pittman reference teaches a measuring device comprising a surface of arbitrary length and curvature (see page 4 Figure, "CODE DISC & HUB ASS'Y," an arbitrary suface can include flat surfaces) upon which is placed a multitude of alternating reflective and non-reflective markings (inherent property of "CODE DISC"), and a sensor capable of detecting said alternating reflective and non-reflective markings (see page 3 table, "HEDR-8000 Sensor") whereby displacement between said sensor and said surface is measured through slideable movement between said sensor and said surface of arbitrary length and curvature. (HEDR-8000 sensor measures "CODE DISC" from required gap distance specified on page 4 table *Code Disc Gap Specifications*).

In regards to claim 8, the Pittman reference teaches the device wherein the output of said sensor consists of one electronic signal (see page 2, Figure *Output Waveforms*) thereby able to measure motion in one direction only (see page 1, "2 channel quadrature squarewave'). It would have been well known to a

person having ordinary skill in the art to which the subject matter pertains that the availability of two channels allow for the selection of only reading one channel, if so desired.

In regards to claim 9, the Pittman reference teaches the device wherein the output of said sensor consists of two electronic signals (see page 1, "2 channel quadrature squarewave'), oriented 90 electrical degrees (phase shifted) from each other (see page 2, Figure *Output Waveforms*), thereby able to measure motion in both directions. It would have been well known that quadrature (~90 degree phase difference) outputs enable indication of motion and direction. While one channel is used for indication of any motion at all, the second channel output serves the purpose of indicating direction of motion, in typical applications.

In regards to claim 10, the Pittman reference teaches the device wherein the output of said sensor includes an electronic signal (see page 1, "2 channel quadrature squarewave') that indicates the presence of a reference mark (see page 1, "shaft angle"). A starting or "reference" location is required to measure an "angle" which is a vector quantity by definition. Any one of the inherent "CODE DISC" marks can be therefore considered a "reference mark".

In regards to claim 11, the Pittman reference teaches the device wherein the electronic signals of said sensor's output are analog representations (see *Agilent - Technical Data*, inherent property of HEDR-8000 used) of the amount of light detected by the sensor (see *Agilent - Technical Data*, inherent property of HEDR-8000 used).

In regards to claim 12, the Pittman reference teaches the device wherein the electronic signals of said sensor's output are made to conform to RS-422 differential signaling standards (see page 1, "Integral RS-422 high speed differential line driver").

In regards to claim 13, the Pittman reference teaches the device wherein the electronic signals of said sensor's output are made to be compatible with TTL inputs (see page 1, "translates...into TTL-compatible outputs" and see also "2 channel quadrature squarewave TTL-compatible outputs").

Claims 1 and 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by the Agilent HEDR-8000 Reflective Optical Surface Mount Encoder with its corresponding data sheets, including *Reflective Optical Surface Mount Encoders - Technical Data*, http://www.avagotech.com/pc/downloadDocument.do?id=3056, dated February 19, 2004 (Copyright 2003) and *Design and Performance Considerations with the Agilent HEDR-8000*, http://www.avagotech.com/pc/downloadDocument.do?id=4608, dated August 20, 2002 (Copyright 2002). These references will be referred to as *Agilent – Technical Data*, and *Agilent – Design,* respectively.

In regards to claim 1, the Agilent reference teaches a measuring device comprising a surface of arbitrary length and curvature (see *Agilent – Design* page 1, Figure 1, "CODEWHEEL OR CODESTRIP") upon which is placed a multitude of alternating reflective and non-reflective markings (see *Agilent – Design* page 1, Figure "CODEWHEEL OR CODESTRIP"), and a sensor capable of detecting said alternating reflective and non-reflective markings (see *Agilent – Design* page 1, Figure 1, "Agilent HEDR-8000 Block Diagram") whereby displacement between said sensor and said surface is measured through slideable movement between said sensor and said surface of arbitrary length and curvature. (see *Agilent – Design* page 1, "as the codewheel rotates, an alternating pattern of light and dark corresponding to the pattern of the codewheel falls upon the photodiodes").

In regards to claim 8, the Agilent reference teaches the device wherein the output of said sensor consists of one electronic signal (see *Agilent - Design*, page 1, section on Basic Operating Principles)

thereby able to measure motion in one direction only (see *Agilent - Design*, page 1, "Channels A and B"). It would have been well known to a person having ordinary skill in the art to which the subject matter pertains that the availability of two channels allow for the selection of only reading one channel, if so desired.

In regards to claim 9, the Agilent reference teaches the device wherein the output of said sensor consists of two electronic signals (see *Agilent - Design*, page 1, section on Basic Operating Principles), oriented 90 electrical degrees from each other (see *Agilent - Design*, page 1, "Channels A and B"), thereby able to measure motion in both directions. It would have been well known that quadrature (~90 degree phase difference) outputs enable indication of motion and direction along a single dimension. While one channel is used for indication of any motion at all, the second channel output serves the purpose of indicating direction of motion, in typical applications.

In regards to claim 10, the Agilent reference teaches the device wherein the output of said sensor includes an electronic signal (see *Agilent – Design*, page 1, section on Basic Operating Principles) that indicates the presence of a reference mark (see page 3, Figure 3, "CODEWHEEL"). A starting or "reference" location is required to measure an "angle" which is a vector quantity by definition. Any one of the inherent "CODE WHEEL" marks can be therefore considered a "reference mark".

In regards to claim 11, the Agilent reference teaches the device wherein the electronic signals of said sensor's output are analog representations (see *Agilent - Technical Data*, inherent property of HEDR-8000 used) of the amount of light detected by the sensor (see *Agilent - Technical Data*, inherent property of HEDR-8000 used).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the above cited Agilent HEDR-8000 documents in further view of Official notice of well known practices in the art and the well known technique of marking surfaces known as stamping.

In regards to claim 3 the Agilent reference teaches the device as discussed with respect to claim 1 above. The Agilent reference does not teach the device wherein said surface is inherently non-reflective and said reflective markings are applied to said non-reflective surface. It is well known in the art that the definition of reflectance is broad in the art depending on the material, composition, and structure of a given surface and the portion of light spectrum being used. In keeping with the optical spectrum, for example, a "red" LED will reflect a larger percentage of light from an equally red-pigmented surface. Silver or aluminum have a broad usage to achieve reflectance for a wide range of frequencies in the optical spectrum, as exemplified by telescope mirrors. Non-reflectance can also be considered in multiple ways, for example, as either absorption or a level or transparency, with equally broad applications in the art. The simplest well know definition is the color scheme of opaque white versus opaque black markings. Official notice of the above well known practices in the art is hereby taken. Black versus white is clearly exemplified by the Agilent "codewheel" figures (see *Agilent – Design* page 1, Figure "CODEWHEEL OR CODESTRIP"). Therefore given the multitude of possible designs that are well known in the art for a surface with contrasted reflective and non-reflective regions, stamping is a particularly well known

technique for creating such a marked surface, where the well known benefit of stamping is the ability to create a repeated and consistent predetermined pattern on any surface. Official notice of the well known practice of stamping is hereby taken. Stamping is therefore a technique for creating a repeatable and consistent pattern of alternating black and white marks, where black and white are only examples, and stamping provides the ability to apply white marks to a black surface, or black marks to a white surface, or the prior example with any variety of colors.

In regards to claim 4, the Agilent reference does not teach the device wherein said surface is inherently reflective and said non-reflective markings are applied to said reflective surface. This limitation is obvious for the same reasoning in regards to claim 3 above.

It would have been obvious to a person having ordinary skill in the art to which the subject matter pertains that techniques of stamping can be used to create a reflective or non reflective (i.e. white or black) surface design with a reflective or non reflective substance (i.e. white or black), respectively or vice versa, in order to create a repetitively and consistently patterned code strip.

Claims 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the above cited Agilent HEDR-8000 documents, and further in view of Official notice of the well known techniques of marking surfaces, in particular the technique known as etching. Etching means to cut a design or inscription into a hard surface, especially for printing and includes synonyms of carving, engraving, and incising. The benefit to etching is found when a particular surface has a desired property with an additional desired surface property underlying such that it is beneficial to remove the top surface in order to expose the underlying region. Etching is especially useful in very fine design applications where tools for removal of solids can be machined to smaller dimension than tools for selective applications of substances applied as liquids. Official notice of the well known process of etching is hereby taken.

In regards to claim 5, the Agilent reference teaches the device as discussed with respect to claim 1 above. The Agilent reference does not teach the device wherein said surface is inherently reflective, a non-reflective coating is applied to said reflective surface, and alternating reflective areas are subsequently revealed by selective removal of said non-reflective coating. In light of the well known practice of etching defined above, the Agilent reference teaches the device wherein the "codewheel" (see *Agilent – Design* page 1, Figure "CODEWHEEL OR CODESTRIP") surface can be created in exactly such a way. The "codewheel" Figure defines an alternating white and black pattern and the specification further defines fine requirements for the code strip specifications (see *Agilent - Technical Data*, page 1, "Encoding Resolution Options"). It would have obvious to a person having ordinary skill in the art to which the subject matter pertains to coat a white surface with a black ink or paint such that the alternating black and white pattern could be created by etching the black surface coating selectively, in order to achieve the fine line requirement of the Agilent device.

In regards to claim 6, the Agilent reference does not teach the device wherein said surface is inherently non-reflective, a reflective coating is applied to said non-reflective surface, and alternating non-reflective areas are subsequently revealed by selective removal of said reflective coating. In light of the well known practice of etching defined above, and the above argument with respect to claim 5 for the reverse design, it would have been obvious to a person having ordinary skill in the art to which the subject matter pertains to coat a black surface with a white ink or paint such that the alternating black and white pattern could be created by etching the white surface coating selectively, in order to achieve the fine line requirement of the Agilent device.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following citations of U.S. Patents, Pre-grant Publications (PGPub), or non-patent literatures (NPL) are included in order to exemplify the state of the art to which the application is related. U.S. PGPub No. 20030230708 A1 and U.S. Patent No. 6963064 B2 further detail the above cited Pittman 35mm ROSE Encoder. U.S. Patent No. 6523957, by Barry Walton et al., issued 2/25/2003, shows the state of camera dolly complexity with its curvy track, self propelled capability, and programmable motion control. U.S. Patent No. 6220172, by Robin Day, issued 4/24/2001, teaches of an RS-422 data link establishing an industry standard in the art of camera motion control. U.S. Patent No. 5296090, by Guido Solares, et al., issued 3/22/1994 shows motion control photography. U.S. Patent No. 5138154, by Steven p. Hotelling, issued 8/11/1992 shows the usage of optical encoders on various curved surfaces including spheres and cylinders. U.S. Patent No. 4395630, by Ramsden et al., issued 7/26/1983, exemplifies a curved marked surface in a sliding relationship with an optical sensor. U.S. Patent No. 5253531, by Dana A. Walker, et al., issued 10/19/1993, exemplifies a curved marked surface in a sliding relationship with an optical sensor. U.S. Patent No. 2845710, by R. Claret, et al., issued 8/5/1958, exemplifies a curved marked surface in a sliding relationship with an optical sensor. U.S. Patent No. 4477189, by Alfons Ernst, issued 10/16/1984, exemplifies various incremental measurement techniques. U.S. Patent No. 5404226, by Helmut Kellner, issued 4/4/1995, exemplifies the usage of multiple sensors for multiple dimension motion detection. U.S. Patent No. 4793067, by Wolfgang Reimar, et al., issued 12/27/1988, exemplifies the usage of reference tracks in optical scales. U.S. Patent No. 4989193, by Claude Tinet, issued 1/29/1991, exemplifies the usage of optical sensors in reading information from an arbitrarily pitted optical compact disk. U.S. Patent

No. 6181658, by Van Den Enden, et al., issued 1/30/2001, exemplifies a system wherein a compact disc is burned such that the track patterns having varying curvy modulation in addition to alternating bits of information in order to send additional position information to the optical sensor. U.S Patent No. 6695668, by Donahue, et al., issued 2/24/2004, exemplifies a robotic system for optically following a curved path using alternating black and white marked surface tape. "Measuring Speed Using a Computer-Several Techinques," by Jon M. Pearce, Copyright 1988 describes techniques in art for measuring motion with "ticker strips." "*Where Am I?* Sensors and Methods for Mobile Robot Positioning," by J. Borenstein, et al., Copyright 1996, presents a very comprehensive report on the state of optical, infrared, and ultraviolet sensing techniques utilized in autonomous robotics. "Linear Electric Encoder-Principles of Operation," by Yishay Netzer, Copyright January 2001, describes the operation of standard or "ordinary" linear non-optical encoder for variety of available industry options.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan J. Giglio whose telephone number is (571) 270-1028. The examiner can normally be reached on M-F, 7:30AM-5:00PM EST, Alt. Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Robertson can be reached on (571) 272-4186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Bryan Giglio
6/19/06

DAVID L. ROBERTSON
PRIMARY EXAMINER